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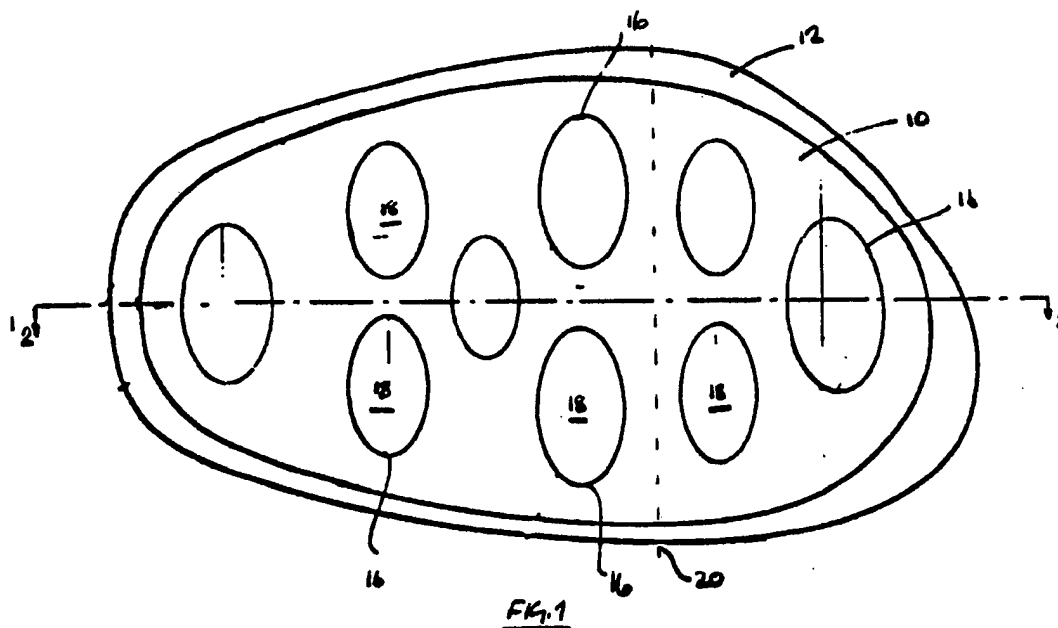
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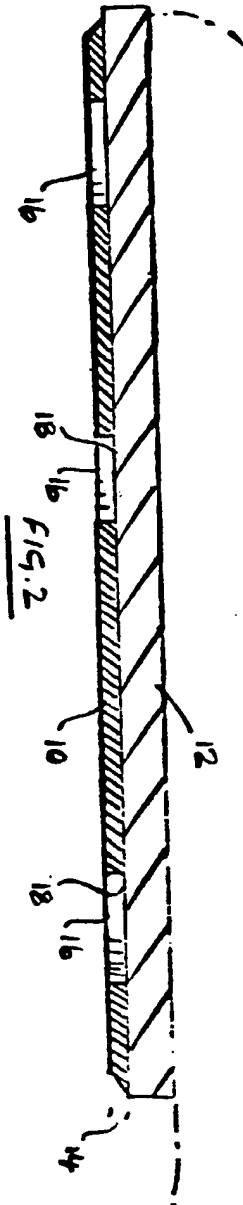
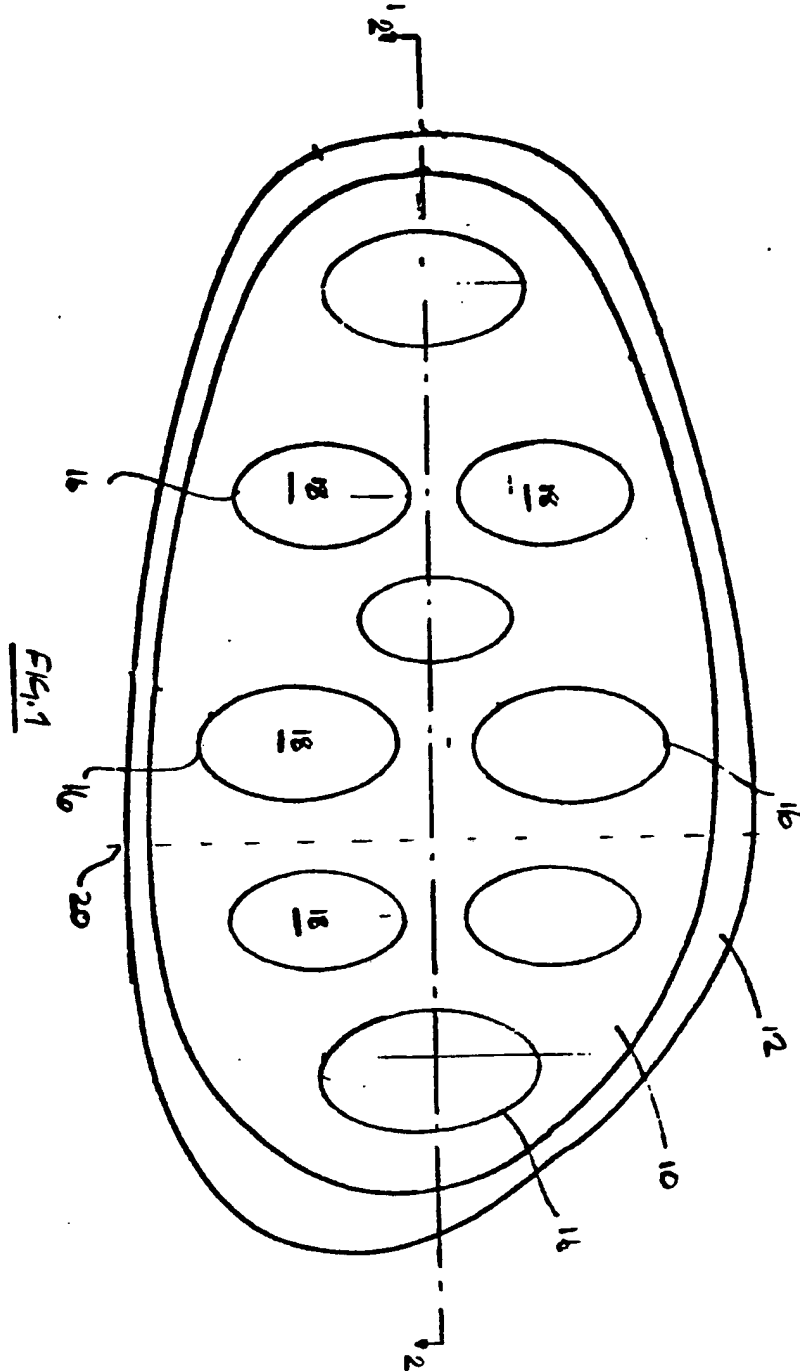
(54) Shoe sole protection device

(57) Sole protection means for leather-soled shoes consists of a synthetic separate sole 10 adapted to be fitted over leather sole 12. A plurality of through perforations 16 are provided in the synthetic sole for permitting parts of the leather sole to be exposed so that they can breathe when the separate sole is bonded or mounted to the leather sole. The individual through perforations 16 may be of various shape and size or may be formed as channels. The protection means may extend over the whole shoe bottom, either as a single unit (22, Fig. 3) or separate sole and heel units (32, 34, Fig. 5), or fitted to the upper.

Alternatively, the sole, heel or upper may be covered by strips of protective material to form channels between (Figs. 8-12).



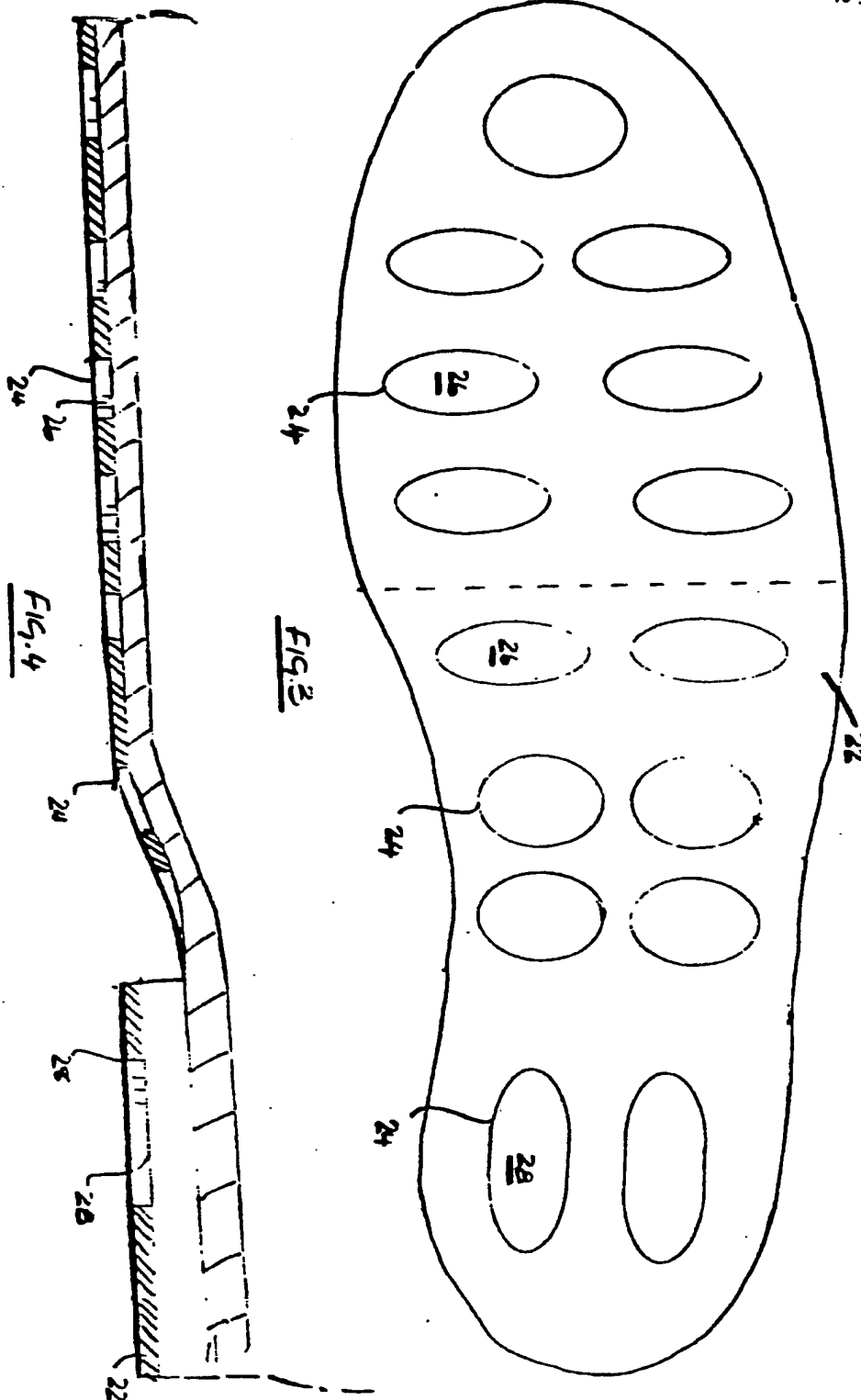
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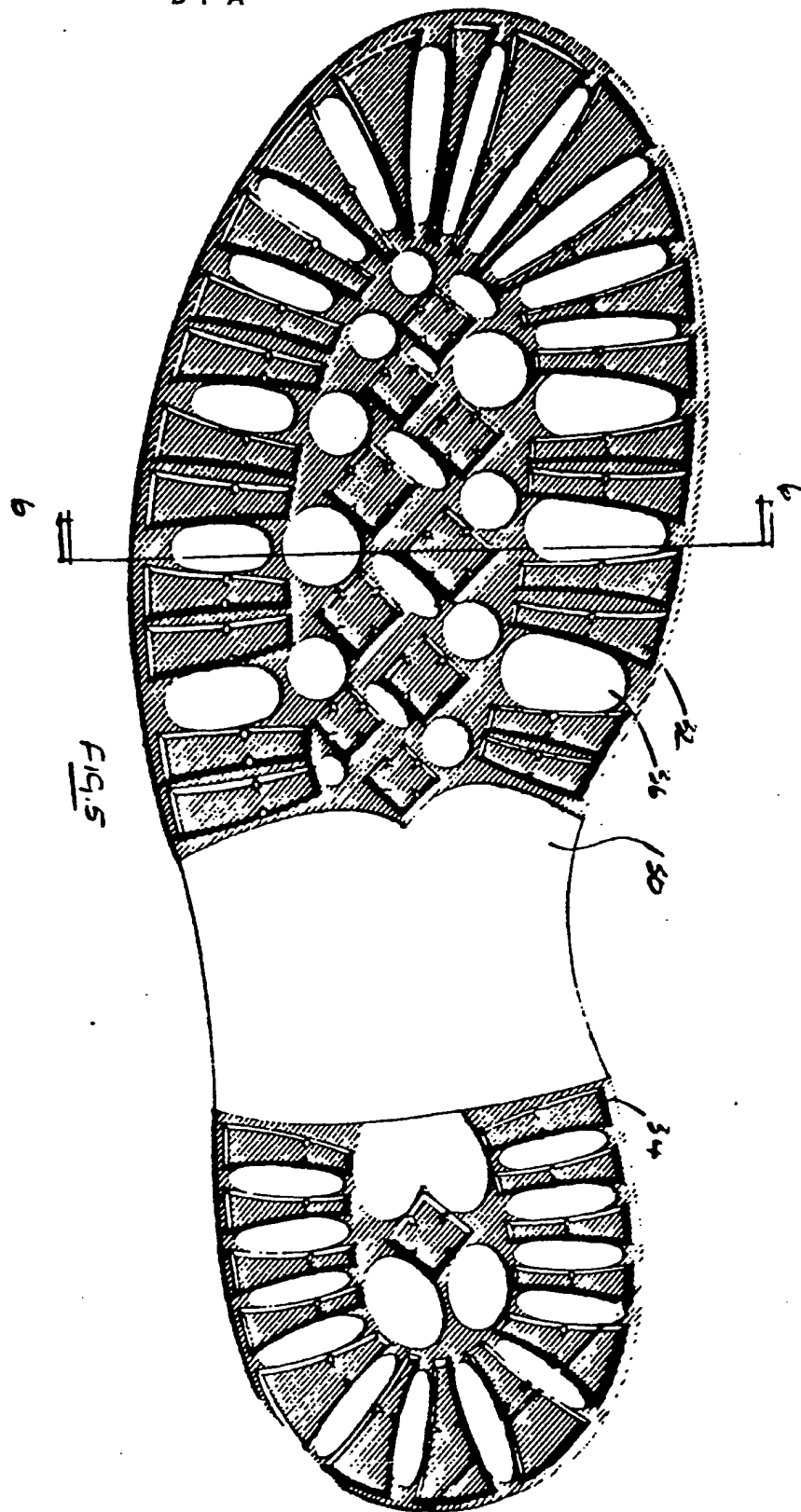
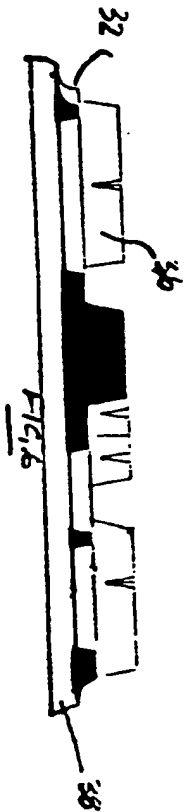
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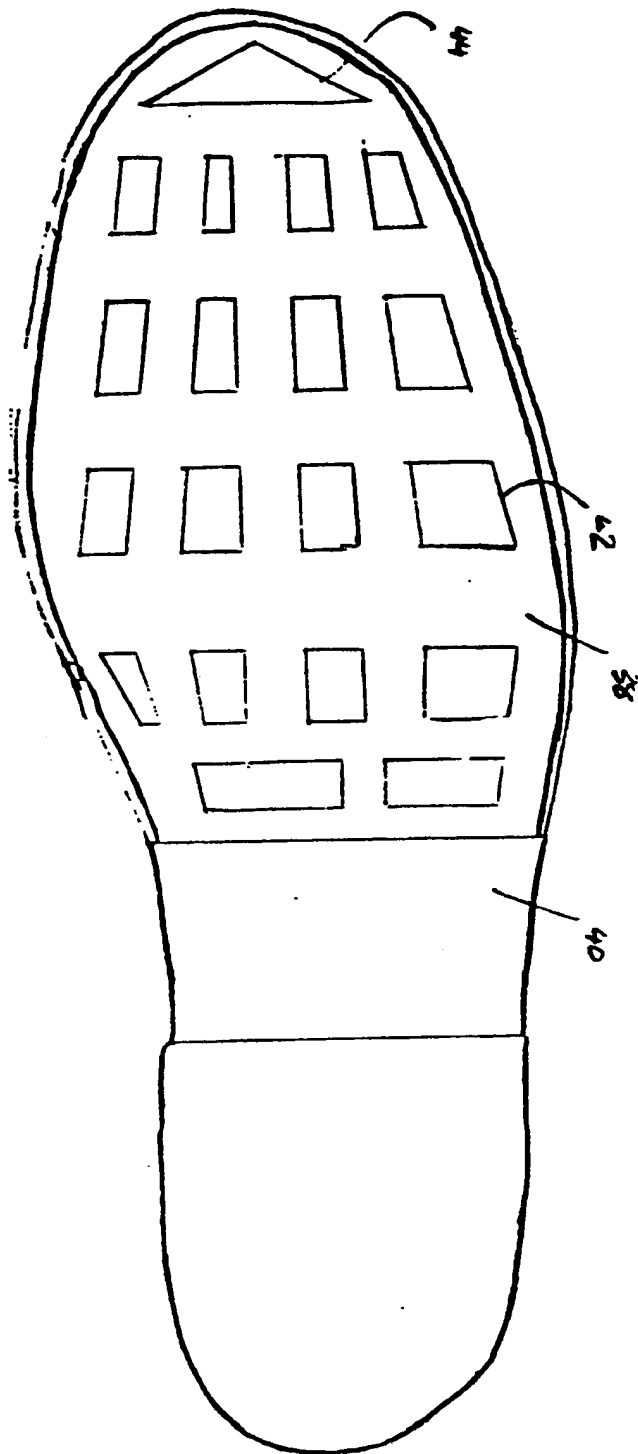


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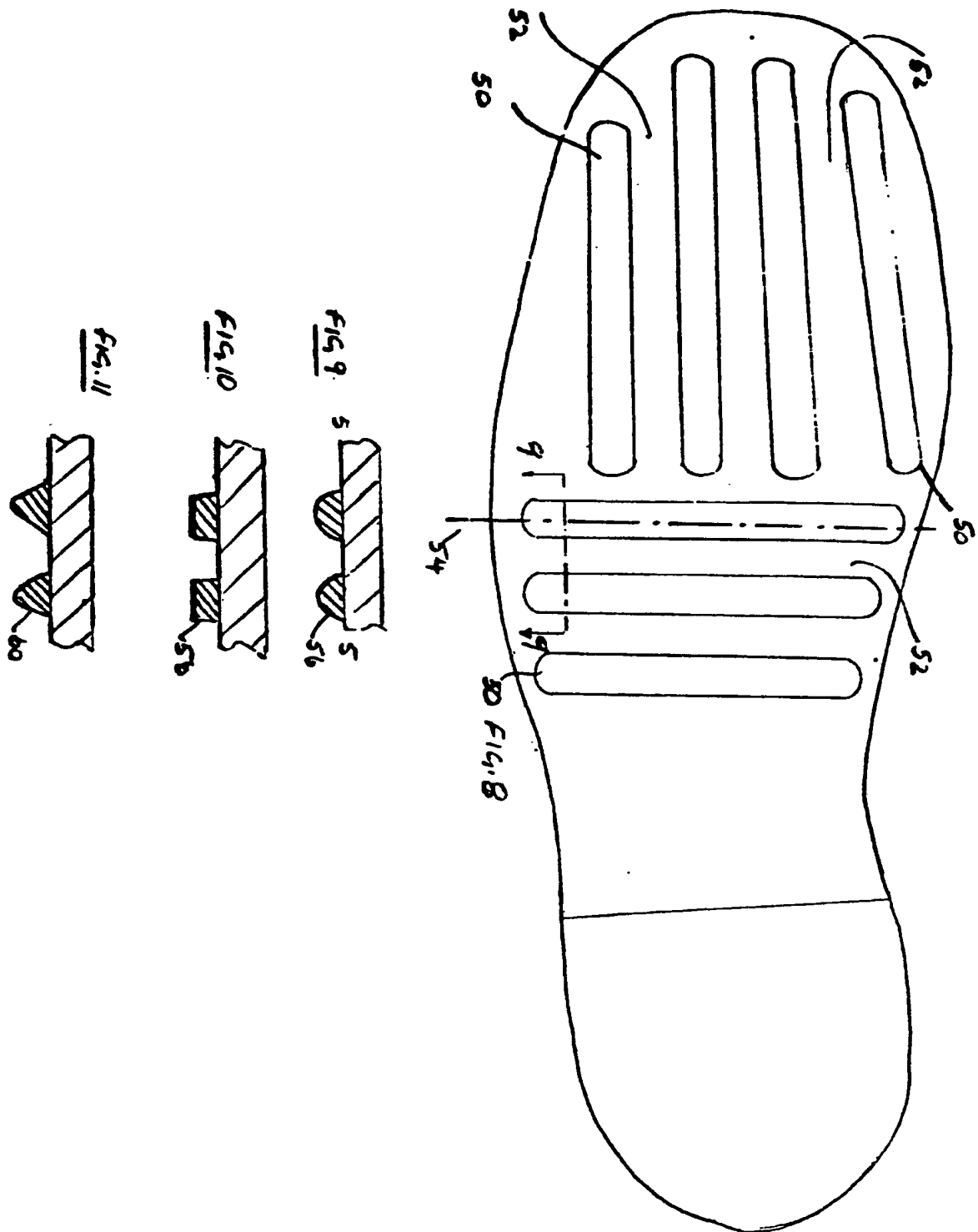
FIG 7



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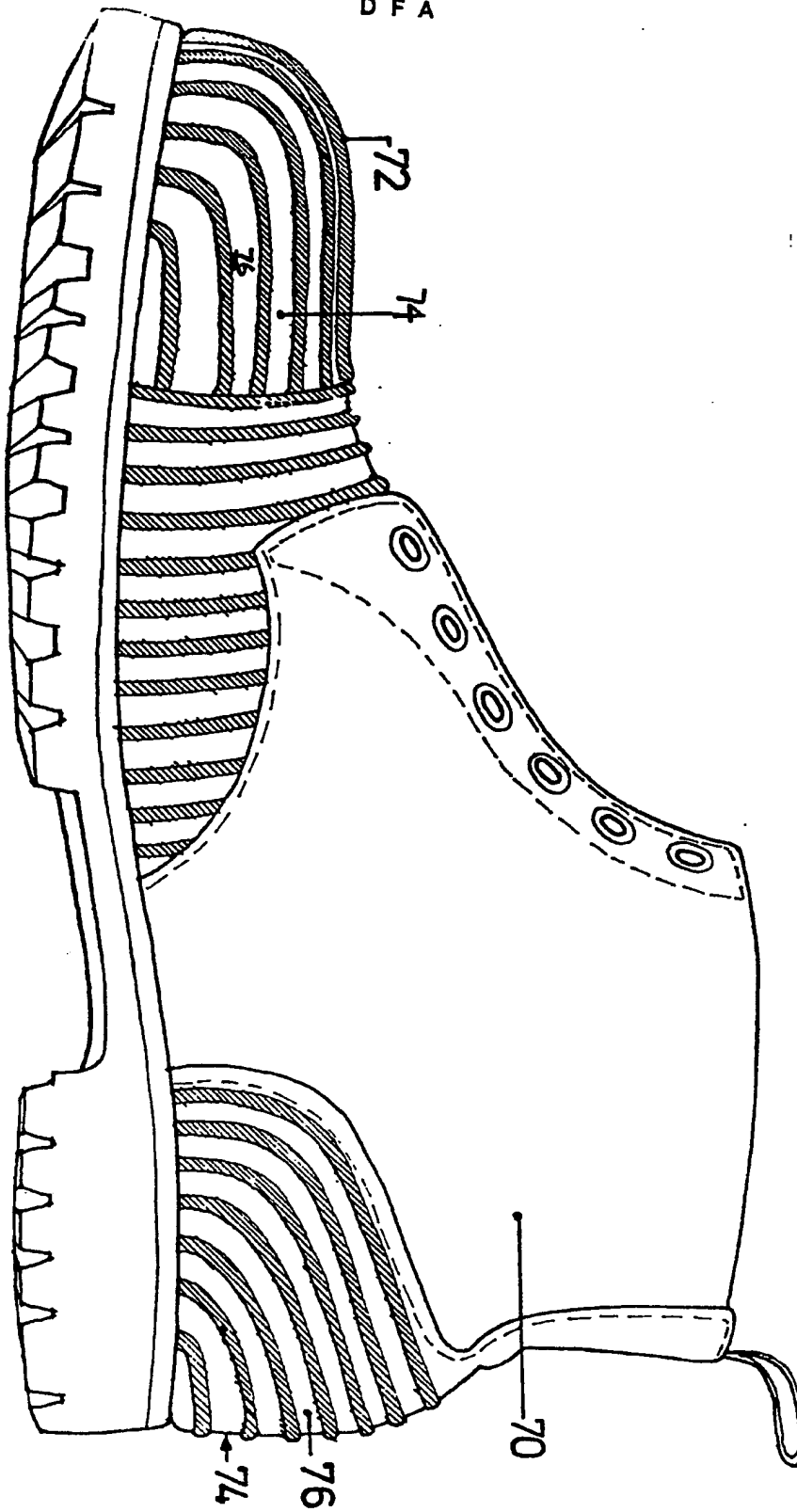
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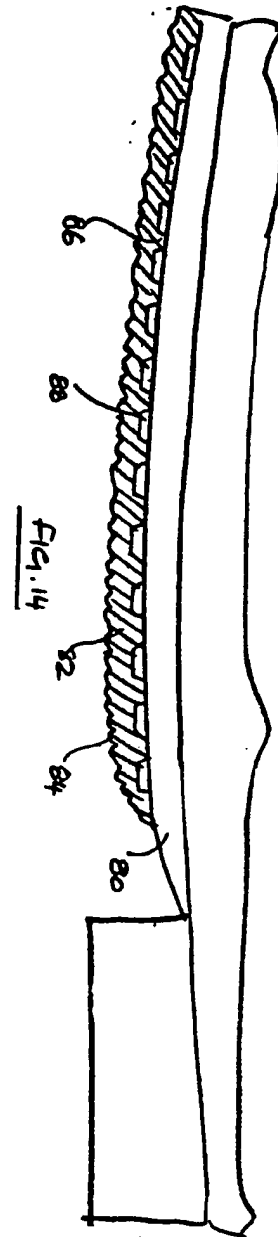
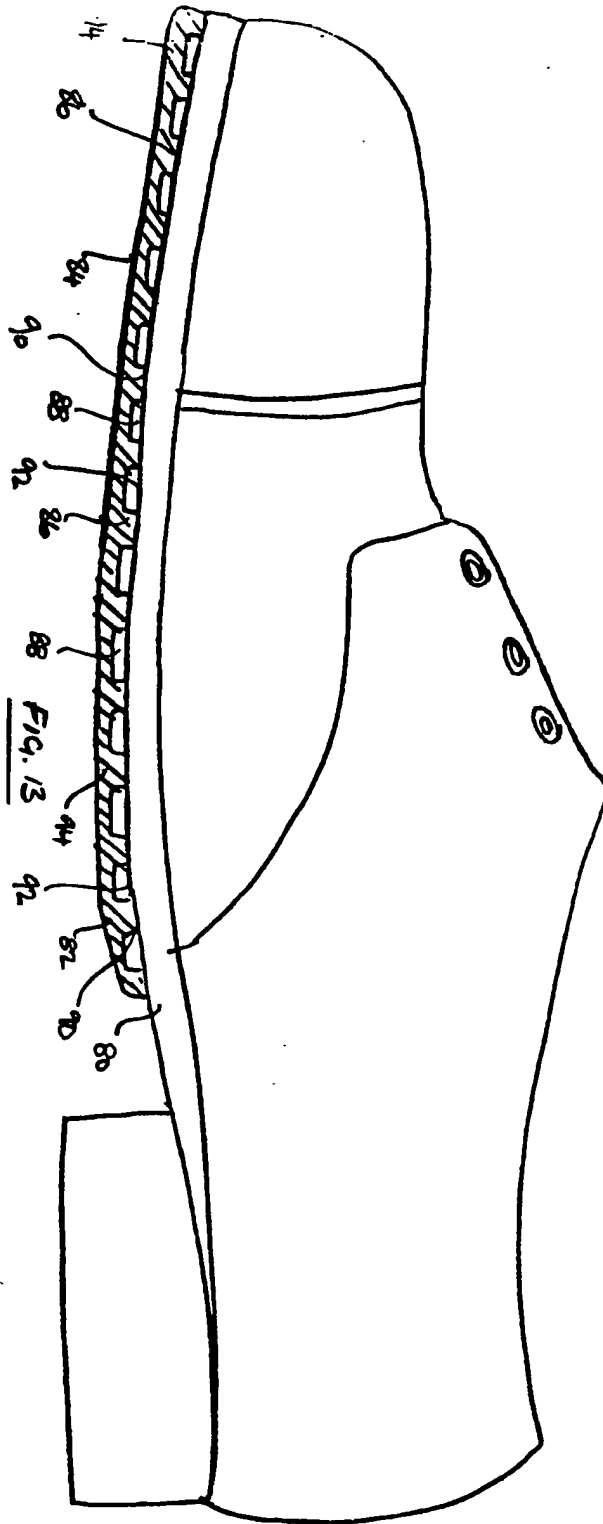
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FIG 12





SPECIFICATION

Improved breathable shoe sole

- 5 The present invention relates to shoe sole protection means, and in particular, the invention relates to sole protection means for protecting leather soles and which are breathable for permitting maximum comfort of feet whilst
- 10 also protecting the feet from the environment.
- It is well known that shoes having leather uppers and soles are the most comfortable type of shoe because leather permits the feet to breathe and also leather shoes mould themselves to the shape of the feet providing proper support for feet and legs and minimising discomfort and fatigue. In particular, leather soles permit the sole of the feet to breathe and this is important, because in normal use,
- 20 heat generated at the sole due to pressure and friction results in sweat which must be released and evaporated. With leather soles this is possible because of pores of this natural fibre. Leather shoes that best mould to the shape of the feet are those that consist of a filler with a layer of cork. The cork acts as a breathable damp proof barrier, yet it moulds to the shape of the feet, giving full support to the base of the foot.
- 30 One problem of leather soles is that they tend to wear easily, particularly in wet weather. Leather is actually waterproof and it permits the passage of sweat out while preventing ingress of water and dirt, however wear nevertheless reduces this natural waterproofing ability and facilitates further abrasion of the sole. However, if treated with various tanning materials, it becomes resistant to the action of water and bacteria and does not
- 40 decompose. The pliable product is then called leather. The properties that distinguish leather are its flexibility, resiliency, porosity, high tensile and tear strength, and ease of fabrication. Even more important for the shoe industry, the principal market, is a unique characteristic of leather, namely water-proof permeability, which contributes to the dissipation of perspiration. For years the outer layer of leather has been removed or destroyed by manufacture or
- 50 walking hence reducing the water resistance property of leather. When leather soled shoes are walked upon in wet weather, sole contact with the wet pavement surface, and the weight of the body that is transmitted and bearing on the soles and the wet ground, causes pressure between the surfaces. This pressure forces the water into the leather soles and when the sole flexes it causes a pumping action thereby assisting the absorption
- 60 of water into the leather sole.
- The advantage of leather soled shoes is that should the shoes get soaked in the inside, the leather sole allows the water to drain out and hence the feet to dry out.
- 65 The disadvantage of a solid rubber sole is

that the water does not escape and hence causes prolonged wetness of the feet.

This is especially relevant to footwear that is subject to wet terrain.

- 70 The breathing of the heel component is not as critical for ventilation since the heel area is exposed to the atmosphere through the opening in the shoe.

- Repairing leather shoes is expensive and, of course, wear of the repaired sole is the same of the original sole. Consequently many people frequently stick a solid synthetic sole over the leather sole for protection. However, this destroys the property of leather by preventing the sole from breathing and heat generated due to pressure and friction is unable to escape so that moisture inside the shoe can result and rot the leather internally. Solid rubber stick-on soles tend to become separated from the leather soles because of air pockets formed as the leather sole breathers.

- Also shoes having leather uppers and synthetic soles have the same problem because the soles of the feet do not breathe naturally and can result in discomfort and swelling of the feet.

- A breathable shoe sole should satisfy a number of basic criterion in addition to being long lasting and naturally breathable. The sole should provide a more flexible sole and should also provide and grip in addition it should be naturally waterproof and resistant to wear and, at the same time, permit the sole to breathe. It should also be capable of being made in a variety of shapes to suit different situations and should be usable in different weather conditions from hot summers to cold winters without adversely affecting the breathable and waterproofing properties of the sole.

- 105 An object of the present invention is to obviate and mitigate disadvantages associated with the aforescribed shoe soles.

- This is achieved by providing a separate member on top of a leather member such that the separate member defines a plurality of spaced through which the leather member can breathe. In the case of a leather sole, the spaces permit the leather to breathe but the thickness of the separate sole spaced the exposed leather sole parts from ground contact and results in protection of the leather by minimising abrasion of the leather and retains the natural waterproofing properties of the leather sole whilst simultaneously permitting it to
- 120 breathe.

- Accordingly, in one aspect of the present invention there is provided sole protection means for use with leather shoes, said sole protection means comprising a separate sole adapted to be fitted over a leather sole, said separate sole having a predetermined thickness, a plurality of through perforations in the sole for permitting parts of the leather sole to breathe when the separate sole is mounted to
- 130 the leather sole.

Preferably, the separate sole is synthetic and planar with said through perforations formed therein. Alternatively the separate sole is formed by a plurality of separate synthetic sole elements adapted to be mounted on the leather sole and arranged to define exposed leather gaps therebetween for permitting the leather sole to breathe.

Preferably also, heel protection means can be provided for leather heels, said heel protection means comprising a synthetic heel element adapted to be mounted to a leather heel, and said synthetic heel element defining a plurality of gaps for permitting the leather heel to breathe.

Preferably, the exposed leather sole parts are not disposed at the line of wear and bend of the leather sole.

The perforations can be circular, oval or of any convenient shape and the synthetic sole elements can be strips of discs or any other shape suitable for attachment to the sole. The holes in the soles should be shaped so that edges be mounted and tapered. This is best for bonding and also reduces scuffing and dirt may be dislodged easier, and the soles should be grooved to allow venting and displacement of water. Also the thickness of the synthetic sole is related to the leather sole thickness so that "feeling" of the perforations by the feet is minimised. Synthetic sole elements can be of any convenient cross-section suitable with providing adequate grip and fulfilling the function of minimising sole wear and permitting the leather sole to breathe. For example it could be generally hemispherical, rectangular or triangular cross-section.

Preferably the sole protection means is bonded to the leather sole although it could be nailed, stitched or secured in any other convenient manner.

In another aspect of the invention there is provided a leather footwear protection member comprising a material adapted to be fitted over a portion of leather for protection thereof, said footwear protection member having a plurality of perforations therein to define opening for permitting the leather to breathe.

In yet another aspect of the present invention there is provided an article of footwear having a leather sole, and sole protection means imposed over said leather sole, said sole protection means having a predetermined thickness, a plurality of through perforations in the sole for permitting exposed parts of the leather sole to breathe.

In yet another aspect of the present invention there is provided sole protection means for use with leather shoe soles, said sole protection means comprising a separate sole adapted to be fitted over a leather sole and having channel means defining spaces for permitting parts of the leather sole to communicate with the atmosphere, and means for preventing said parts from contacting the ground.

Preferably, said channel means provide communication between the parts of the sole and the side of the sole protection means. Conveniently, said channel means are defined by spacing ribs, the upper parts of which are secured to the leather sole and said channel means terminate substantially coextensive with the boundary defined by the leather shoe sole.

Preferably also, the said means for preventing said parts contacting the ground has a substantially smooth ground contacting sole. Alternatively, this sole can be textured or patterned as desired to give grip.

In yet another aspect of the invention there is provided an article of footwear having a leather sole, and sole protection means having a channel means as defined above.

Further aspects of the invention will become apparent from the following description taken in combination with the accompanying drawings in which:-

Our Figure 1 is a bottom plan view of a leather sole to which a sole protection means according to one embodiment of the invention has been attached;

Figure 2 is a cross-sectional view taken on the lines 2-2 of Fig. 1;

Figure 3 illustrates a leather sole having the centre sole protection means covering the sole and heel element;

Figure 4 is a cross-sectional view taken on the line 4-4 of Fig. 3.

Figure 5 is a bottom plan view of a sole of an outdoor shoe or boot having sole and heel protection means in accordance with a first embodiment of the invention;

Figure 6 is a cross-sectional view taken on the line 6-6 of Fig. 5;

Figure 7 is a bottom plan view of an alternative sole protection means;

Figure 8 is a bottom plan view of a leather sole having sole protection means in the form of a plurality of synthetic sole elements according to a second embodiment of the invention;

Figure 9 is a cross-sectional view taken on the lines 9-9 of Fig. 8;

Figures 10 and 11 are cross-sectional views similar to Fig. 9 showing different cross-sections for the shoe protection element, and

Figure 12 is a diagrammatic view of an embodiment of the invention applied to shoe uppers;

Figures 13 and 14 are diagrammatic views of further embodiments of the invention.

Reference is now made to Figs. 1 and 2 of the drawings which illustrates a sole protection means generally indicated by reference numeral 10 bonded to a leather sole 12 of a leather shoe. The sole protection means 10 is generally the same shape as a leather sole 12 and is made from a synthetic material having a predetermined thickness 14. The sole 12 defines a plurality of generally oval shaped through perforations 16 to expose leather sole

portions 18 to permit the leather sole 12 to breathe.

It will be appreciated that there is a sufficient number of perforations 16 to permit adequate ventilation of the foot but that the sole protection means 10 spaces the exposed portions 18 from the ground so the ground contact with the exposed portions is minimised. This is important around the line of wear and bend generally indicated by reference numeral 20. For this reason there are no perforations over this line of bend so that the risk of exposed sole portions coming into contact with the ground is minimised.

With this arrangement it will be appreciated that the exposed leather sole portions are spaced above the ground so that abrasion does not destroy the natural waterproofing effect of the sole whilst at the same time permitting the natural leather sole 12 to breathe through the perforations 16. The sole protection means 10 can be made of any convenient synthetic material for example rubber and can be bonded to the sole 12 by any suitable adhesive such as Evostick (Trade Mark). The perforations 16 may be made by stamping out portions from a stick-on type of synthetic sole to result in the sole protection means. Or the breathable sole may be manufactured in one process by moulding or extruding the desired shape from the raw material hence saving material and cost of manufacturing time.

Reference is now made to Figs. 3, 4 of the drawings which shows a leather shoe sole having mounted thereon a sole protection means 22 which covers the front part of the sole as well as the heel the shoe protection means 22 defines a plurality of through perforations 24 for exposing leather sole portions 26, leather heel portions 28 and it must be appreciated that this complete shoe sole could be formed by moulding or stamping out a solid rubber sole as described with reference to Figs. 1 and 2.

Reference is now made to Figs. 5 and 6 of the drawings which are similar to Figs. 3 and 4, and which depict an outdoor shoe with a natural leather sole 30 having a rugged outer sole 32 and heel 34 of synthetic material bonded thereto. The sole and heel also have perforations 36 to permit the natural leather to breathe but the shoe is, of course, suitable for rugged outdoor use. This sole could be formed by moulding or stamping a solid synthetic sole.

Fig. 7 illustrates another type of a synthetic sole 38 bonded to a leather sole 40. The synthetic sole 38 has a plurality of generally rectangular perforations 42 the size of which are determined by the thickness of the leather sole. For example, if the leather sole is thin the perforations 42 can be smaller than if the sole were thick if it is desired not to "feel" the perforations within the feet. It will be appreciated that the perforations can be of any

suitable shape, such as the triangular perforation 44 in the toe portion, oval or rhombic or the like.

Reference is now made to Figs. 8 to 11 of the drawings which illustrates the sole protection means in accordance with a second embodiment of the invention. Referring firstly to Fig. 8 it will be seen that sole protection means consists of a plurality of synthetic strips 50 bonded to the leather sole in a particular pattern to define exposed leather portions 52 therebetween. The synthetic strips 50 are oriented on the sole to maximise grip and minimise contact of the exposed portions of the sole with the ground, particularly at the line of wear and bend 54.

The elements 50 can be bonded to the sole by adhesive such as Evostick although they could be secured in any other convenient manner, for example, by nailing, stitching to the sole.

The elements shown in Fig. 9 are generally hemispherical in cross-section 38 although it will be appreciated that other suitable cross-sections can be used for example Fig. 10 shows strips having a generally rectangular cross-section 58 and Fig. 11 shows strips having a generally triangular cross-section 60. Elements 50 can be of any suitable cross-section consistent with providing adequate wear properties and being securable to the sole to permit comfort and grip properties in use. The strips shown in Figs. 8 to 11 may be conveniently made by extruding a strip of a particular cross-section and then cutting this to the desired length.

It will be understood that various modifications may be made to the embodiments hereinbefore described without departing from the scope of the invention. For example the separate sole protections means may be made of a natural material e.g. leather as well as a synthetic material although it will be appreciated that the natural leather will probably have to be replaced sooner than the synthetic material, however it will still perform the function of permitting the sole to breathe while resulting in the natural waterproofing feature of the sole being retained. Also the sole and strips can be made of any convenient shape and material to fit a variety of sole sizes and shapes. The synthetic sole can be bonded to the leather sole during the shoe manufacture so that the leather shoe is sold with an integral, and replacable sole protection means. The thickness of the sole and size of perforations can be varied. For example, the sole perforation can be proportioned and arranged to stimulate the soles of the feet. In this case, the soles of the feet "sense" the perforations and slightly move relative to the sole so that the feet and blood circulation in the feet are stimulated resulting in a therapeutic benefit, without generating a feeling of discomfort.

The synthetic sole can be of various de-

grees of thickness depending on the type of shoe and its use. For example, Army boots would have a thick sole (5mm), mens town shoes a medium sole e.g. 2mm and ladies dress shoes a thinner sole e.g. 1-2mm. It will be appreciated that outer sole edges taper to a minimal thickness so that the edges bond easily with undulations of the leather sole. In the case of synthetic materials the bonding agent causes the edges to be somewhat solvent to provide an improved leather-synthetic sole bond or weld. When a bonding agent is used it should be compatible with the leather and rubber any excess is removed to avoid inadvertently sealing the openings. Also, the sole can be a homogenous material on a composite. For example a synthetic sole with an inner porous aerator compound and an outer hardened sole. The sole can be made of rubber, neoprene or any suitable compound and the material should be non-slip.

It should also be understood that a protective breathable member can be applied to leather uppers as well, for example on Army boots, outdoor shoes. This can be applied in a similar manner to the sole protection member with a shroud bonded or welded over the leather upper with a plurality of perforations to permit the upper to breathe but at the same time prevent scuffing or abrasion of the upper so retaining its waterproof properties. This could also be achieved by sticking a plurality of protection members on the upper in a similar manner to the second embodiment described with regard to the sole. An example of a protection member applied to leather uppers is shown in Fig. 12 wherein a leather upper 70 has a protection member in the form of adhesive strips 72 bonded thereto which define a plurality of spaces 74 adapted to expose portions of the leather upper 76 beneath the aperture. The synthetic protection member prevents abrasion or scuffing of the upper and hence the natural waterproofing ability of the leather upper is retained whilst at the same time the upper of the foot can breathe through the exposed leather portions.

The protection member for leather uppers may be bonded, stitched or attached in any other suitable manner and of course can be formed by synthetic member by stamping out the member and moulding it into shape with the perforations therein. In addition, in the case of adhesive strips or other shape of protection member these can be bonded to the upper in any convenient pattern to permit breathing as well as protection of the leather uppers. One other convenient form may be to have ribs extending from the toes along the length of the shoe to expose channels of the leather so that any dirt or foreign material can be easily removed by wiping along the channel. This structure would have the advantage of permitting the leather upper to breathe whilst at the same time protecting the upper and retaining

its waterproofing abilities.

Other embodiments of the invention are illustrated in Figs. 13 and 14 of the drawings. In Fig. 13 a leather sole 80 has a synthetic sole protection means 82 bonded or stitched thereto. The synthetic sole protection means 82 has a smooth sole surface 84 and a rubber upper surface formed by a plurality of spaced generally rectangular parallel ribs 86. The ribs 86 define parallel channels 88 and when the sole protection 82 is bonded to the sole 80 only the top surfaces 90 of the ribs are, in fact, bonded to the sole. Channels 88 extend across the width of the sole to provide communication between sole parts 92 and the external atmosphere at the side of the sole to permit the leather sole to breathe, but remains spaced from the ground by synthetic sole portion 94.

Fig. 14 shows a similar sole to that in Fig. 13 except that the sole surface 84 is roughened to provide added grip, and this surface could be any convenient shape, for example, it could have a castellated ribbed surface like that bonded to the leather sole. Also the channels need not extend right across the sole; they could extend partially across the sole and could be of any suitable shape size and pattern to permit adequate ventilation and breathing of the leather sole. Also the modifications described with reference to the other embodiments are also applicable to the embodiment described with reference to Figs. 13 and 14.

It will be understood that holes are proportioned to avoid hinderance to foot pedals in vehicles and the like.

Advantages of the invention are that the beathable property of the natural leather sole is maximised, the wear on the leather sole is minimised and the natural waterproofing ability of leather is not destroyed by abrasion. In addition, the choice of a suitable sole protection means or shape of elements can provide added grip to the sole resulting in improved safety and costly repair of leather soles is avoided. Also, the use of apertures prevents the formation of air pockets and avoids sole separation because of this. The embodiments described permit a leather shoe to be easily and readily modified to permit the sole to have minimal wear and to breathe whilst retaining the natural waterproof effect by simply bonding a separate synthetic sole of synthetic strip elements to the leather sole. The leather sole does not have to be replaced, only the stick-on sole, also the stick-on sole does not affect the symmetry of the sole so that the shoes will retain balance and last longer.

CLAIMS

1. Sole protection means for use with leather shoes, said sole protection means comprising a separate sole adapted to be fitted over a leather sole, said separate sole

having a predetermined thickness, a plurality of through perforations in the sole for permitting parts of the leather sole to breathe when the separate sole is mounted to the leather sole.

2. Sole protection means as claimed in claim 1 wherein the separate sole is synthetic and planar with said through perforations formed therein.

3. Sole protection means as claimed in claim 1 wherein the separate sole is formed by a plurality of separate synthetic sole elements adapted to be mounted on the leather sole and arranged to define exposed leather gaps therebetween for permitting the leather sole to breathe.

4. Sole protection means as claimed in claim 1 including heel protection means can be provided for leather heels, said heel protection means comprising a synthetic heel element adapted to be mounted to a leather heel, and said synthetic heel element defining a plurality of gaps for permitting the leather heel to breathe.

5. Sole protection means as claimed in claim 3 wherein the exposed leather sole parts are not disposed at the line of wear and bend of the leather sole.

6. Sole protection means as claimed in claim 1 wherein the perforations can be circular, oval or of any convenient shape and the synthetic sole elements can be strips of discs or any other shape suitable for attachment to the sole.

7. Sole protection means as claimed in claim 1 wherein the thickness of the synthetic sole is related to the leather sole thickness so that "feeling" of the perforations by the feet is minimised.

8. Sole protection means as claimed in claim 2 wherein said synthetic sole elements can be of any convenient cross-section suitable with providing adequate grip and fulfilling the function of minimising sole wear and permitting the leather sole to breathe.

9. Sole protection means as claimed in claim 1 wherein the sole protection means is bonded to the leather sole although it could be nailed, stitched or secured in any other convenient manner.

10. A leather footwear protection member comprising a material adapted to be fitted over a portion of leather for protection thereof, said footwear protection member having a plurality of perforations therein to define opening for permitting the leather to breathe.

11. An article of footwear having a leather sole, and sole protection means imposed over said leather sole, said sole protection means having a predetermined thickness, a plurality of through perforations in the sole for permitting exposed parts of the leather sole to breathe.

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